

JC912 U.S. PTO
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UTILITY
PATENT APPLICATION
TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	
First Inventor	David Carl
Title	Free Fall & Game Simulator
Express Mail Label No.	

JC815 U.S. PTO
09/17/2004

11/20/00

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. Applicant claims small entity status
See 37 CFR 1.27.
3. Specification [Total Pages 15]
(preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to sequence listing, a table, or a computer program listing appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
4. Drawing(s) (35 U.S.C. 113) [Total Sheets 4]
5. Oath or Declaration [Total Pages 19]
 - a. Newly executed (original or copy)
 - b. Copy from a prior application (37 CFR 1.63 (d))
(for continuation/divisional with Box 18 completed)
 - i. **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. Application Data Sheet. See 37 CFR 1.76

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

7. CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. Computer Readable Form (CRF)
 - b. Specification Sequence Listing on:
 - i. CD-ROM or CD-R (2 copies); or
 - ii. paper
 - c. Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. Assignment Papers (cover sheet & document(s))
10. 37 CFR 3.73(b) Statement (when there is an assignee) Power of Attorney
11. English Translation Document (if applicable)
12. Information Disclosure Statement (IDS)/PTO-1449 Copies of IDS Citations
13. Preliminary Amendment
14. Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
15. Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. Request and Certification under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. Other:

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:

 Continuation Divisional Continuation-in-part (CIP)

of prior application No. _____

Prior application information

Examiner _____

Group Art Unit _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. CORRESPONDENCE ADDRESS

<input checked="" type="checkbox"/> Customer Number or Bar Code Label			or	<input type="checkbox"/> Correspondence address below
Name	24000			
Address	PATENT TRADEMARK OFFICE			
City		State		Zip Code
Country	Telephone			Fax
Name (Print/Type)	Dennis B. Haase		Registration No. (Attorney/Agent)	22,037
Signature			Date	11/16/00

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PATENT APPLICATION FEE DETERMINATION RECORD					Application or Docket Number FREE FALL & GAME SIMULATOR				
CLAIMS AS FILED - PART I (Column 1) (Column 2)					SMALL ENTITY	OTHER THAN SMALL ENTITY			
FOR		NUMBER FILED	NUMBER EXTRA	RATE	FEE	RATE			
BASIC FEE (37 CFR 1.16(a))		*		\$ 355		\$ _____			
TOTAL CLAIMS (37 CFR 1.16(c))		12 minus 20 =	* -0-	x \$ _____ = -0-		x \$ _____ =			
INDEPENDENT CLAIMS (37 CFR 1.16(b))		1 minus 3 =	* -0-	x _____ = -0-		x _____ =			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(d))					+ _____ =		+ _____ =		
*					TOTAL		TOTAL		
* If the difference in column 1 is less than zero, enter "0" in column 2									
CLAIMS AS AMENDED - PART II (Column 1) (Column 2) (Column 3)					SMALL ENTITY	OTHER THAN SMALL ENTITY			
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDI- TIONAL FEE	RATE	ADDI- TIONAL FEE	
		Total (37 CFR 1.16(c))		*	Minus	**	=	x \$ _____ =	
		Independent (37 CFR 1.16(b))		*	Minus	***	=	x _____ =	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))					+ _____ =		+ _____ =		
*					TOTAL		TOTAL		
(Column 1) (Column 2) (Column 3)					ADDITIONAL FEE		ADDITIONAL FEE		
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDI- TIONAL FEE	RATE	ADDI- TIONAL FEE	
		Total (37 CFR 1.16(c))		*	Minus	**	=	x \$ _____ =	
		Independent (37 CFR 1.16(b))		*	Minus	***	=	x _____ =	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))					+ _____ =		+ _____ =		
*					TOTAL		TOTAL		
(Column 1) (Column 2) (Column 3)					ADDITIONAL FEE		ADDITIONAL FEE		
AMENDMENT C		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDI- TIONAL FEE	RATE	ADDI- TIONAL FEE	
		Total (37 CFR 1.16(c))		*	Minus	**	=	x \$ _____ =	
		Independent (37 CFR 1.16(b))		*	Minus	***	=	x _____ =	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))					+ _____ =		+ _____ =		
*					TOTAL		TOTAL		
(Column 1) (Column 2) (Column 3)					ADDITIONAL FEE		ADDITIONAL FEE		

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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FREE FALL AND GAME SIMULATOR

The present invention relates, in a general sense, to a device for creating a vertically disposed air current capable of suspending one or more humans within the current, but, more importantly, a multi-faceted system for both the training and 5 entertainment of members of the public who wish to experience the exhilaration of free fall flight in any one of several selected simulated environments, including, but not limited to, the capacity to play games in a state of free flight suspended animation.

BACKGROUND OF THE INVENTION

Field of the Invention

10 There is an innate aura of excitement and anticipation, particularly in the minds of the American public, surrounding the sensation of weightlessness which accompanies a free fall from significant heights. Unfortunately, there are few, if any, facilities which permit one to satisfy this appetite in a safe and reasonably economical environment. There are, of course, facilities which teach and otherwise foster the sport 15 of sky diving. However, such facilities are inordinately expensive, primarily because of the nature of the equipment required, the cost of operation and the attendant risks. Clearly, exiting an airplane at 10,000 feet or more poses an element of real danger to the student.

20 Alternatively, for the feeling of weightlessness, or suspended animation, one may find, from time to time, a touring carnival which features, as part of its menagerie, a barrel-type device which is rotatable, while folks line the perimeter, and which relies on centripetal force to suspend the participant against the side wall of the barrel while the floor

is lowered so as to offer no supplemental support. Such devices are poor substitutes for the sensation of flight that most of those who seek such thrills hope to emulate.

Overview of the Prior Art

5 While the art is rife with efforts to create a device that will simulate the weightlessness of the skydiving experience, there are few that attempt to create a virtual environment which stimulates one's senses to the extent that he will experience a sense of free fall without the attendant dangers.

An example of such an effort may be found in Kitchen et al. patent 5,655,909. 10 In Kitchen, an otherwise conventional wind tunnel is enhanced by use of a projection screen covering approximately 120° of the side wall of the tunnel, which operates in concert with a series of several projectors, controlled by a transmitter on a back pack strapped to the user's body, to emulate clouds or the like, and, by such, creating the illusion of free fall from a substantial altitude. The nature of the equipment required to maintain the illusion which Kitchen envisions, is both awkward and cumbersome, and the 15 number of flyers who may enjoy the experience simultaneously, is severely limited.

As an aside, but of no particular relevance, a second patent was issued, this time to another Kitchen et al, patent 6,083,110.

Further, it appears rather clearly that the intent and purpose of Kitchen is training, in that the projectors are intended to create virtual emergencies from which the 20 student can recover on a step-by-step basis. Further, the student needs to have sufficient

control over his or her attitude to remain in view of the projection screen, or the intent and purpose of Kitchen et al. is lost.

As previously stated, there is an abundance of art directed to wind tunnel configurations, ranging from the more current, among them including Consolini patent 5,753,811; Lenhart patent 6,042,490; Methfessel patents 5,593,352, and 5,209,702 to the earlier efforts, among them, Olshevsky patent 1,811,364; Hastings patent 2,799,460 and Norheim Jr, patent 3,484 953. It will be appreciated that the earliest of the patents were directed to testing apparatus for aircraft, although in 1969, Norheim, Jr. envisioned a device for simulating free fall for humans.

10 The Lenhart patent, which appears to be the most recent entry, discloses a massive system that supports as many as a dozen players on an air cushion, divided into teams to play a ball game. The system is huge and would require an enormous amount of power, at a not insignificant cost, to create the air cushion, making it impractical, if not impossible, to build.

15 There are, of course, several patents issued in the '80s, but those located do not appear to bear on the patentability of the present invention.

SUMMARY OF THE INVENTION

20 The present invention relates to a convertible chamber in which a vertical column of air is created which is sufficient to suspend at least two persons, sometimes referred to as flyers, in the chamber, while permitting those suspended to move within the column to simulate free fall conditions, and/or play a game, as the persons elect.

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Additionally, the walls of the chamber are of such color, e.g., blue or green, and of such material, that one may video tape or film the activity in the chamber against the side walls, to create a base or primary film. Thereafter, by use of Blue Screen technology on the primary film, which is a well known technique for imposition of an image, 5 or images, on the background created by the wall, a fantasy may be created. For example, a war scene with fighter planes and bursting bombs might create the sensation of the flyer suspended in the middle of a battle.

Consistent with the invention, it is an objective to create an enclosure which is variable in diameter, in which one might experience a variety of free fall maneuvers, both by "feel", in relative safety, and at a cost which renders such an experience accessible to almost anyone who would wish to give it a try.

It is a further objective, consistent with the foregoing, to provide an interactive enclosure that can serve both as an amusement and a serious training facility.

A still further objective of the present invention is to provide a system as described, wherein an inner chamber is removably positioned in order to vary the diameter of the chamber in order to accommodate a specified a number of flyers.

Yet another objective of the present invention is to create an atmosphere from which a subsequent video tape may be fabricated by superimposing a variety of images on the side walls of the chamber, with the result that a taped scene or sequence may be provided for later use in film productions, or simply for the entertainment of the flyer 20 and friends.

Other objects and advantages derived from the use of the present invention will occur to those skilled in the art from a study of the following detailed description thereof, taken in conjunction with the drawings, wherein:

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

5 FIG. 1 is a pictorial view of a free fall simulator constructed in accordance with the present invention, with portions removed in order to more accurately depict the interrelationship of the principal elements of the construction;

FIG. 2 is a top plan view of the free fall simulator, as it is configured for purposes of FIG. 1; and,

10 FIG. 3 is a side elevation of the free fall simulator of FIG. 1, sectioned along line 3-3 thereof, in order to provide a different perspective of the various elements.

DESCRIPTION OF A PREFERRED EMBODIMENT

With reference now to the drawings, and with particular attention being directed initially to FIG. 1, a novel free fall simulator system embodying the salient features 15 of the present invention is there denominated by the numeral 10.

A primary working chamber 11 for the system is defined by a primary wall 12 having a generally circular curvature, inscribing a cylinder through which a column of air under pressure is forced, the diameter of said column being changeable, as readily envisioned in FIG. 2. The wall, initially the primary wall, sometimes referred to as the outer 20 wall 12, which defines the diameter of the column of air has an inner surface 14 which, in

furtherance of the purposes of the invention, is smooth such that there are no appreciable impediments to air flow, thereby permitting laminar flow conditions in at least a lower portion of the air column. As previously alluded to, the system is motivated by a vertical column of air moving with sufficient pressure to support the weight of one to several objects
5 such as persons simulating free fall activity.

As best seen in FIG. 1, the primary, or as sometimes referenced, the primary wall, sits on a screen 16. The screen 16 is fabricated of any one of several readily available high strength materials capable of supporting significant loads, typically comprising one to several persons using the system together with the chamber walls as
10 described.

Disposed within the system 10, in serially spaced relation, is a sub system comprising one or more contiguous air current generator devices, e.g., fans 18. The fans 18 may be positioned above the chamber, or beneath the screen, depending on construction preference, so long as the fans 18 are so positioned as to generate a vertical airstream within the chamber which is both laminar in flow and strong enough to support the number of flyers in the chamber at any given time. It is within the contemplation of the invention that the fans are individually controllable to match the needs of the chamber
15 depending upon its diameter for any given usage.

By generating a column of air upstream of the flyer(s) that is moving in
20 laminar flow, there is a minimal amount of burble, or turbulence, which may adversely effect the flyer's, or flyers', control of his or her flight as well as detract from the overall experience. The very presence of the flyer(s) in the column of air may well cause

turbulence, but such turbulence would tend to be downstream, or as shown, above the position of the flyer(s).

The pressure generator system which creates and sustains the vertical column of air within the chamber may be of a closed type, or open, depending on several factors. If, for example, the weather tends to be cold, or rainy, or both, a closed system is recommended wherein the airstream is completely enclosed, and once beyond the edge of the outer wall 12, is guided, by any number of suitable means, well illustrated in the prior art, back through the system to the fans.

Where temperatures and weather conditions are more temperate and more predictable, an open system may be appropriate and somewhat less costly. In such a system, fresh air is drawn into the system and discharged to the atmosphere downstream of the flyers.

One of the distinguishing features of the present invention is the ability to adjust or vary the diameter of the chamber to accommodate the number of flyers that may wish to participate in unison. Thus, where a smaller than usual number of participants are joined, energy is saved by the creation of a smaller column of moving air.

To accomplish this, the invention contemplates the creation of a smaller diameter inner chamber, which may be defined by the insertion of a secondary, or curtain wall 21, centrally, or more particularly concentrically within the primary chamber. As is well illustrated in the drawings, the curtain wall 21 is of lesser diameter than the primary chamber and may be any one of several diameters. By using the curtain wall, fans disposed between the perimeter of the secondary wall 21 and the primary wall 14 may be

turned off, or where needed, their flow redirected inwardly, in any of several different well known ways. Thus, the amount of power required to generate the appropriate air column is optimized, and the cost of operation proportionately reduced. Ingress and egress to the inner chamber is accomplished through the passage 22.

5 In keeping with the objective of maintaining essentially laminar flow at the flyer position, the inner surface 23 of the curtain is smooth so as to minimize, if not eliminate, any incursion into the airstream. In order, however, to be sure that the curtain wall remains stable and does not decline into a wavy surface due to small pressure differentials, support is provided for the curtain 21 in the form of poles or posts 25. These 10 supports are semi rigid and are disposed in the curtain wall 21 so that no part of the pole is protruding into the air stream, nor does its presence create a bulge therein.

15 Appropriate arrangements are provided for securing the poles' top and bottom for ease in setting up the inner chamber and assuring that it does not inadvertently collapse about a flyer. Cups, not shown, for securing the remote ends of the poles 25 would be one such means, although many well known such devices are within the contemplation of the invention.

20 While the focus of the present invention has been on fun, there is a serious side which is capable of being exploited. Indeed, the present invention provides an avenue for significant income generation well beyond what might be anticipated based on an individual fee basis.

To this end, and in accomplishing this objective, the inner wall surfaces, in addition to being smooth, are of a pastel color, e.g., blue or green. By so doing, the

walls become susceptible to the application of Blue Screen technology, and the system thus a potential profit center.

Specifically, the invention contemplates the capacity to tape the flight of a flyer against the background provided by one of the inner walls 14 or 30. To this end, one or more cameras 40 are movably mounted on a track 42 and may be remotely controlled in any one of several well known manners to film or tape the events within the chambers.

Thereafter, using Blue Screen technology, other images such as, for example, clouds, aircraft in flight, other flyers and myriad other life like moving images can be superimposed to define a montage on those walls about the flyer(s). Thus, the professional film maker, whether for film, advertising promotions or similar uses, has an inexpensive means of creating any number of action scenes which would otherwise have to be scripted and shot live, with an obvious substantial saving.

While the present system is excellent as a training aid to permit instruction relative to sky diving, it is also a device for having just plain fun. To this end, and in keeping with other aspects of the invention, there is provided at least one false wall 30, which has an inner surface 32, which is exposed to the air stream and which contains at least one, and preferably more, orifice(s), or aperture(s), 34. Individuals, or teams of players, while as flyers within the chamber, may attack and defend opposed goals in the form of apertures, in the manner of the most popular of games, e.g., basketball, hockey, soccer and the like. Since the air stream will necessarily displace the "ball", the game becomes particularly challenging.

It will be appreciated that the goal, and the walls that contain them, are so configured as to minimize interference with the flow of air at the level of the flyers, thus maintaining laminar integrity of the air flow up stream of the players.

It is within the contemplation of the invention that the walls 30 be capable of
5 being moved into and out of position relative to the perimeter wall surface 14.

Having thus described a preferred embodiment of the present invention, what is claimed is:

CLAIMS:

1. In a free fall simulator wherein a cylindrical wall is provided, said wall defining a chamber, means for generating a column of air under pressure in said chamber, said column of air moving from bottom to top, the pressure being sufficient to support one or more flyers therein, said wall having a surface, said surface being contiguous with and defining the diameter of said column, the surface of said wall being smooth such that said column of air moves in laminar flow in at least an upstream portion of said column of air.

2. The free fall simulator of Claim 1 wherein the diameter of said column of air is variable within said chamber.

10 3. The free fall simulator of Claim 1 wherein a camera is provided within said chamber, said camera being remotely positionable to photograph said flyers against the background provided by the walls of said chamber.

4. The free fall simulator of Claim 1 wherein the surface of said inner wall being of a pastel color so as to provide a background for use of blue screen technology.

5. The free fall simulator of Claim 3 wherein a circular track is provided in said chamber; said camera being mounted for movement around a circular track such that it is movable to capture said flyers on film or tape at any location and at any angle within said chamber.

10. The free fall simulator of Claim 2 wherein a secondary wall is provided, said secondary wall having a diameter less than said primary wall such that the placement of said secondary wall centrally within said chamber will reduce the diameter of said column of air.

7. The free fall simulator of Claim 1 wherein said air generating means is a series of contiguous fans, said fans being controllable depending on the diameter of said chamber.

8. The free fall simulator of Claim 1 wherein a goal is provided within said use in playing games.

9. The free fall simulator of Claim 1 wherein pairs of opposed goals are
in said chamber for use in playing games.

10. The free fall simulator of Claim 6 wherein the surface of said inner wall being of a pastel color so as to provide a background for use of blue screen technology.

11. The free fall simulator of Claim 6 wherein a camera is provided within said chamber, said camera being remotely positionable to photograph said flyers against the background provided by the walls of said chamber

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12. The free fall simulator of Claim 6 wherein said air generating means is a series of contiguous fans, said fans being controllable depending on the diameter of said chamber.

ABSTRACT OF THE INVENTION

A multi faceted system for simulating free flight, playing games in a free flight mode, and photographing the experience in a manner which permits of the creation of a montage, in which a vertical air column is defined by a variable cylindrical walls, and in which at least a portion of the air column is moving in laminar flow mode.

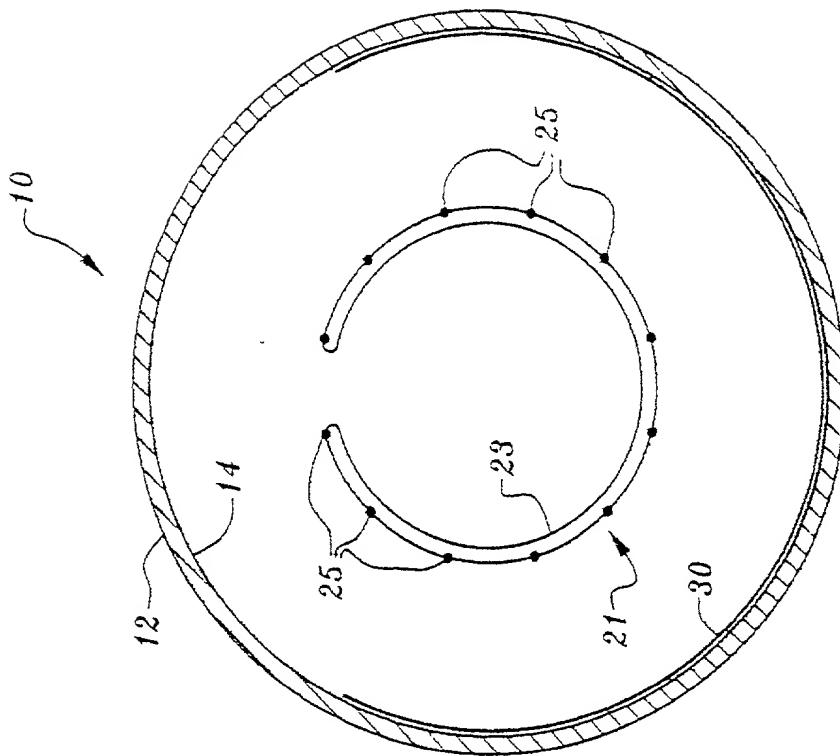


Fig. 2

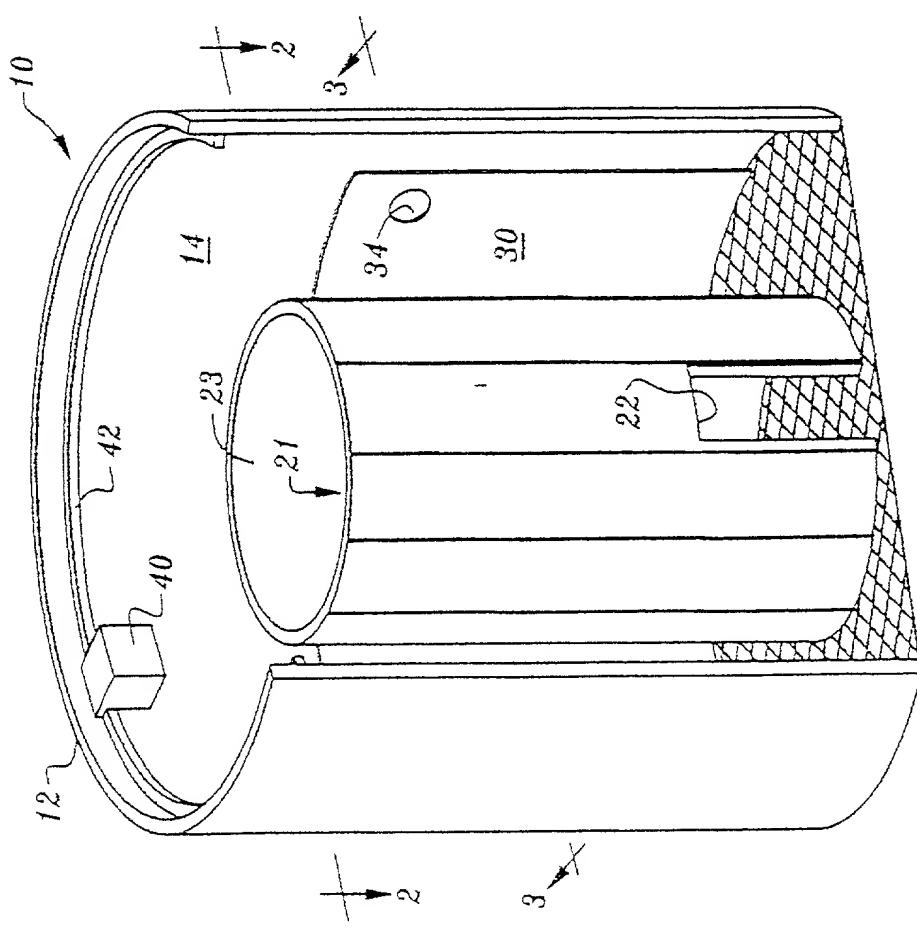


Fig. 1

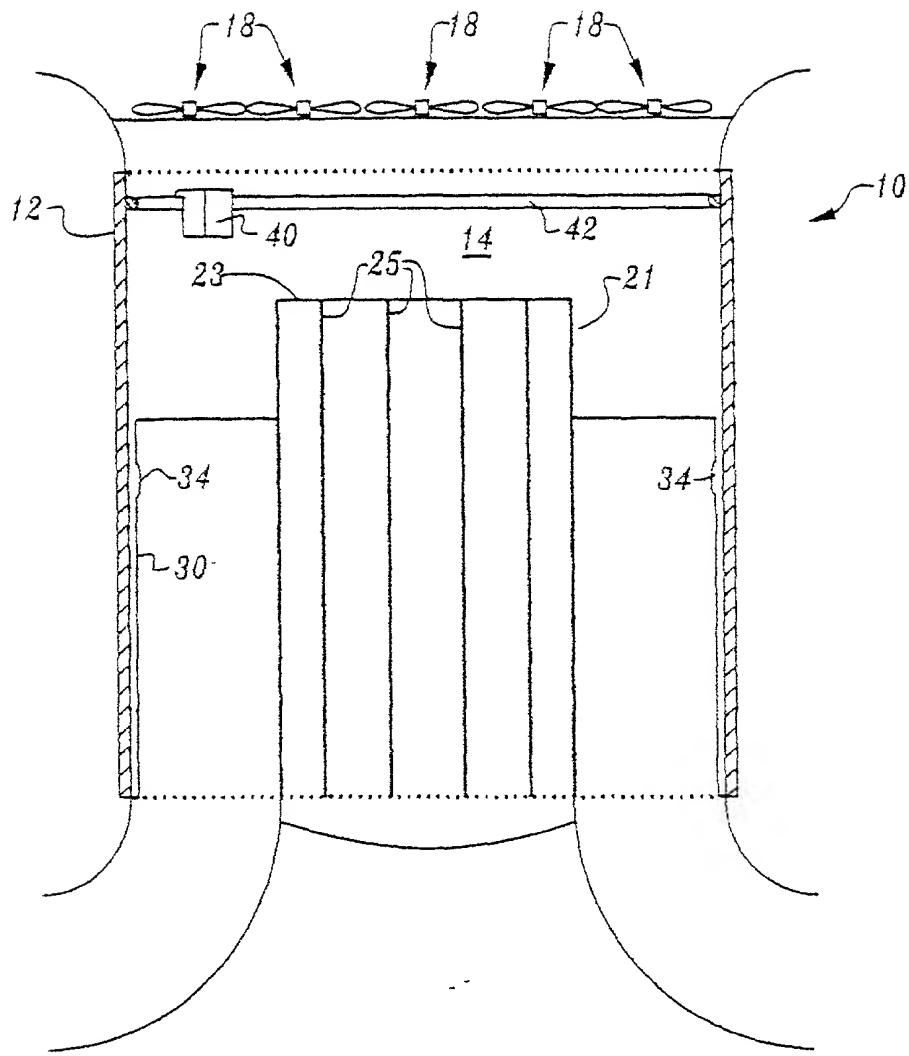


Fig. 3

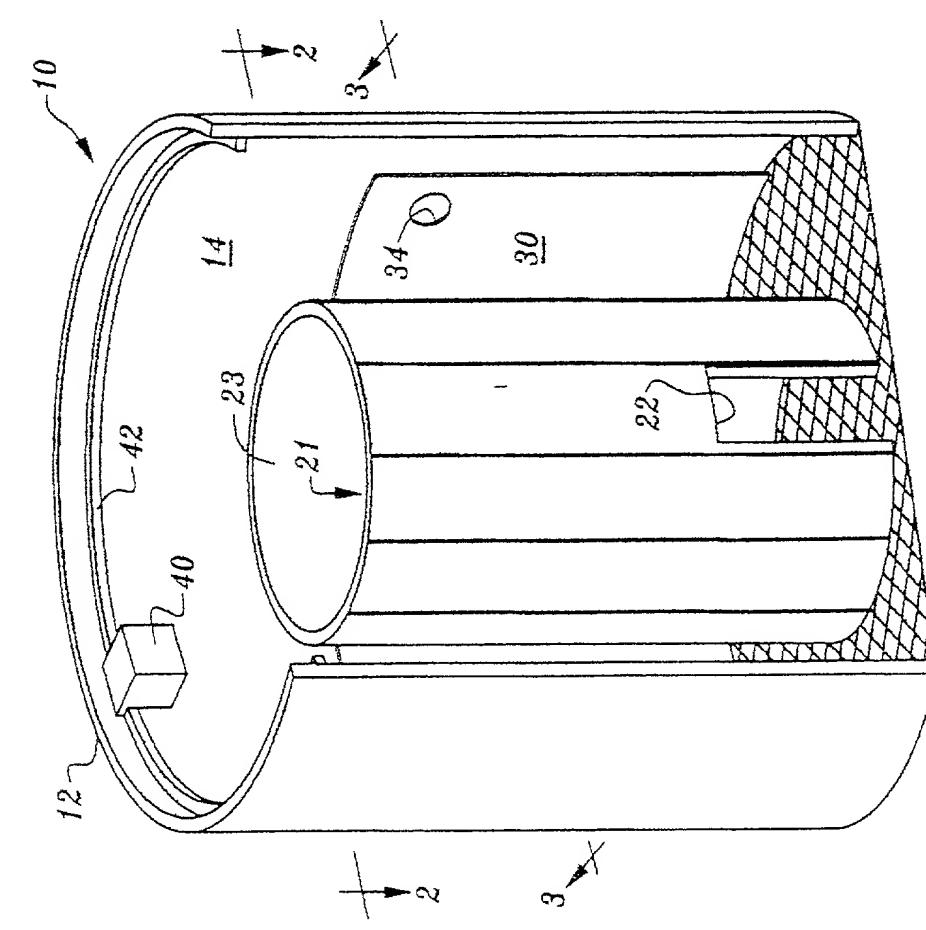


Fig. 1

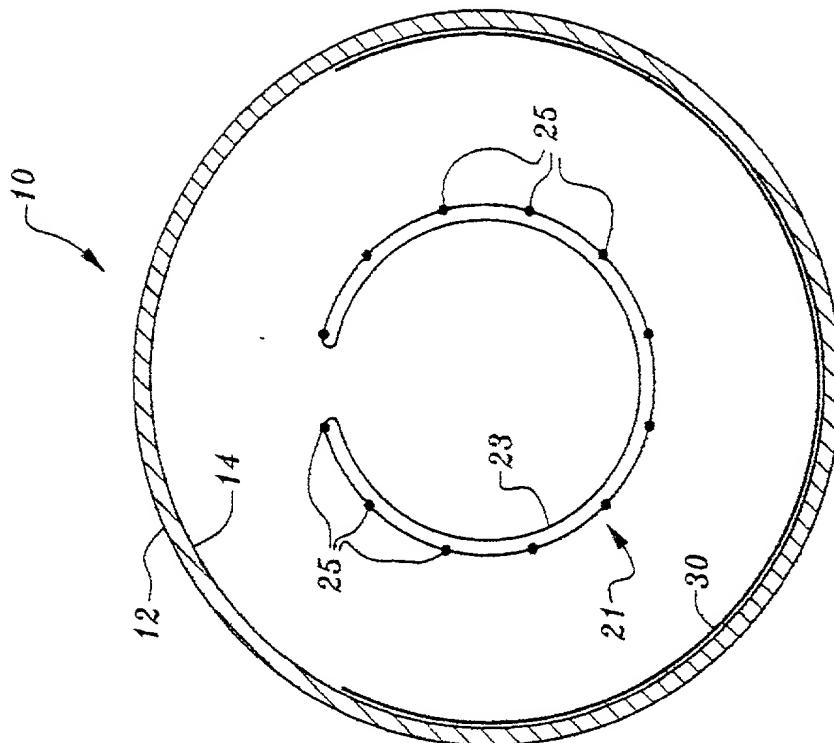


Fig. 2

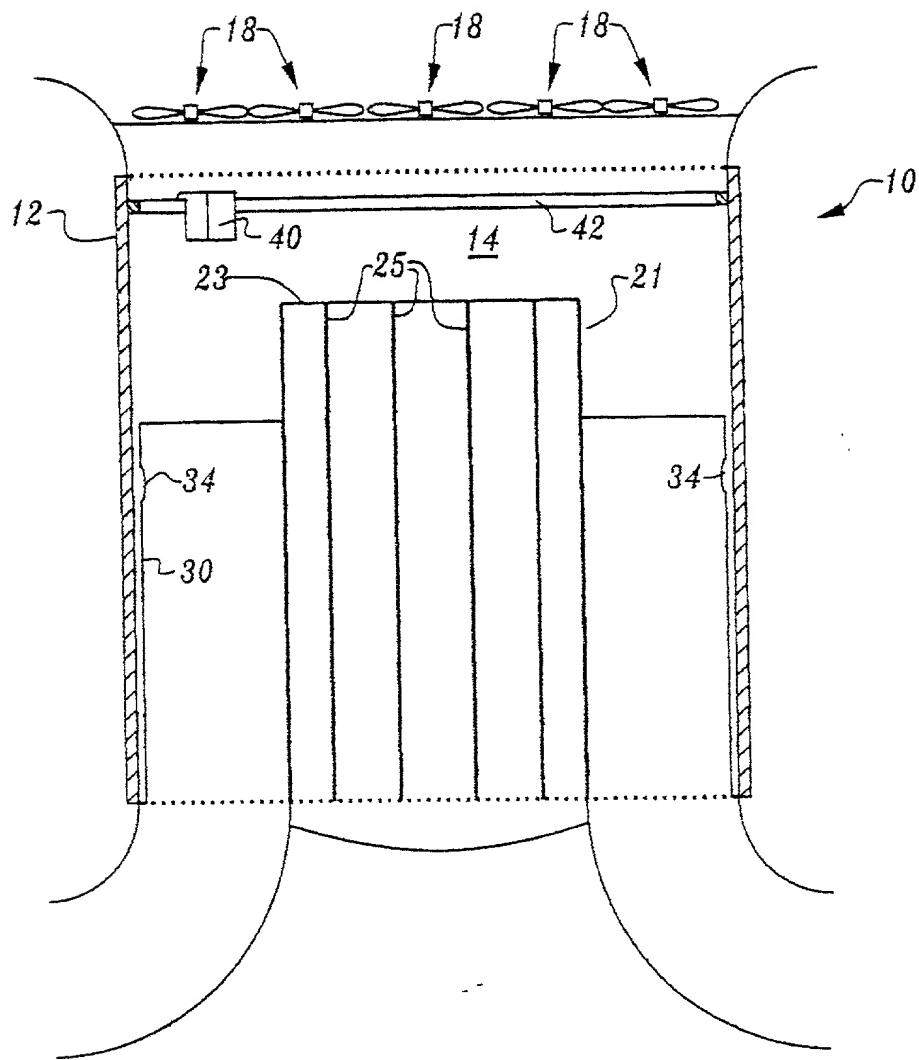


Fig. 3

DECLARATION - UTILITY OR DESIGN PATENT APPLICATION

As a below named inventor(s), I declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a design patent is sought on the invention entitled FREE FALL AND GAME SIMULATOR, the specification of which is attached hereto unless the following box is checked:

was filed on as United States Application Number or PCT International Application Number and was amended on (If applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material as defined in 37 CFR 1.56,

I hereby claim foreign priority benefits under 35 U.S.C. §119 (a)-(d) or §365(c) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)	NONE	Priority Claimed		
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s) Filing Date

I hereby claim the benefit under 35 U.S.C., §120 of my United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose material information which is material to patentability as defined in 37 C.F.R., §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)

I hereby appoint the following registered practitioners to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

CUSTOMER NUMBER: 24000

Address all telephone calls to Dennis B. Haase, Esq. at telephone no. (501) 374-2100

Address all correspondence to Customer Number 24000.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor: DAVID CARL

Inventor's signature David Cade Dated: 11/10, 2000
Residence: 16 Hunter's Green Circle, Little Rock, Arkansas 72211 Citizenship: United States
Post Office Address: 16 Hunter's Green Circle, Little Rock, Arkansas 72211

Full name of second joint inventor, if any: NATHAN GERSHON

Second Inventor's signature Nathan Gershon Date: 11/10, 2000
Residence: 16 Hunter's Green Circle, Little Rock, Arkansas 72211 Citizenship: United States
Post Office Address: 16 Hunter's Green Circle, Little Rock, Arkansas 72211